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THE CHOICE OF A CHOICE STRATEGY: SIMPLIFYING VS. OPTIMIZING

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A preliminary taxonomy of choice strategies open to a consumer was developed and used as a basis for examining the perceived simplifying and optimizing potentials of the respective strategies. The studies indicate decision makers do anticipate that different choice strategies differ in the cognitive exertion required to apply them. The relative difficulty of using different strategies varies as the number of options being considered varies.

A consumer seeking to choose one option from an array of many faces two often antagonistic considerations: (1) his desire to accurately choose that option which will optimize eventual "consumption benefits", and (2) his immediate concerns related to the difficulties of the choice task itself. Consumers are equipped with limited information-handling capacity and often operate under relatively heavy information loads. In trying to lessen congitive strain and quickly escape the unpleasant state of multi-product conflict, they are likely to adjust the choice strategy they apply to the environment at hand. In some cases, the desire to simplify will dominate the desire to optimize, and vice versa. A number of plausible strategies for integrating data on available products and choosing among them can be proposed. Since these strategies will vary in attractiveness as simplifying or optimizing procedures, searching for a general "best" model of the consumer choice process is chasing a will-of-the-wisp. The key question is "Under what decision making conditions are the respective strategies applied, and why?"

A necessary first step in answering that question is to gain insight into the difficulties people experience (or anticipate experiencing) in executing different strategies, and into how these appear to people as choice-optimizing techniques. Execution simplicity should vary as information load varies. Speculating that since Strategy A seems simpler than Strategy B it will be used in difficult conditions is premature until we learn whether Strategies C, D, ... Z are simpler than A or B. This paper attempts a reasonable exhaustive identification of the choice strategies open

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to consumers, then explores their relative status as simplifying or optimizing devices.

A BASIC TAXONOMY OF CHOICE STRATEGIES

A review of normative and descriptive decision-making research revealed a number of formal models. The necessary assumptions underlying these were analyzed, as were other possible assumptions suggested by the comparisons. The fifteen basic models emerging are characterized below within a two-dimensional structure suggested by the comparisons (Figure 1). The two dimensions, labeled "data combination process" (COMB) and "choice rule" (RULE), organize the models in a way which may be meaningful in understanding general simplifying principles.[1]

The models differ on whether they assume a consumer cognitively combines cues about options in a "compensatory" or "noncompensatory" way. Compensatory strategies[2] picture an individual averaging (or adding) cues such that positive and negative cues have a balancing (compensating) impact on his overall impression of the option [1]. Adding and averaging are not identical but the difference won't be relevant for our immediate purposes. Equal weighting (AVG_e) or differential weighting (AVG_d) of the various data dimensions can be assumed. Noncompensatory models assume the consumer combines cues such that the presence (absence) of one cue may not compensate at all for the presence (absence) of others. Examples of noncompensatory strategies are the lexicographic (LEX), conjunctive (CONJ), disjunctive (DISJ), minimax, and maximax. These are described below.

These respective COMB procedures may be used in conjunction with several rules for discriminating the final choice. The choice rule used may affect how simple any of the COMB strategies are to apply in practice. One distinction among possible choice rules is whether the consumer compares options against each other or against some mental criteria. If we assume he uses a "choose the best" (BEST) rule, he is necessarily seen as comparing option vs. option. Alternately, he might establish mental cutoffs as the basis for his decision. Using cutoffs may simplify his task since he avoids tedious option vs. options comparisons, but he may often find several options surpassing his cutoff(s). This leaves him hanging in conflict and implies additional processing of some sort before he can finally choose one (or n). Formal descriptions of cutoff-based models (e.g., conjunctive or disjunctive models [2, 3, 4, 5, 6]) haven't specified solutions for this remaining dilemma. To really make a cutoff-based strategy simple to execute, a person may add a "choose the first one (or n)" rule. Cutoff-based models including a FIRST rule should be distinguished from those not specifying any particular basis for making a unique choice (herein labeled ALL rules).

This structure is offered as a preliminary way for organizing the various strategies open to consumers according to underlying assumptions. Often data combination models are defined without any explicit choice rule, or models of the "within product" evaluation process aren't distinguished from those describing a "between product" choice process. The structure does suggest some fundamental differences which may relate to simplifying or optimizing differences.

The specific strategies cited in Figure 1 are described in detail below.

We assume the output of a consumer's cognitive averaging of data on an option is an estimate of the overall "utility" or "affect" of the option, i.e., he locates each option on his global utility dimension [1]. Given that output, a common assumption has been that he treats this global dimension as continuous and picks the option offering highest utility, a BEST rule. Another plausible assumption is that he sets up a cutoff on his global utility dimension. He might then either class options whose compensatorily created utility rating surpasses his minimum required utility level as "acceptable", or simplify further and choose the first one found offering "acceptable" overall utility. He is seen as performing something akin to a mental discriminant analysis [12, 15, 24]. The key point is that compensatory COMB models can accommodate BEST, FIRST, or ALL choice rules, just as noncompensatory models.

Greater variety exists among non-compensatory models [see 2, 3, 4, 5, 6, 21, 25]. Among the formal models reviewed, three qualify as BEST models. A lexicographic (LEX) model pictures the consumer ordering the relative importance of evaluative dimensions in his mind, then comparing all options on the single most important dimension. If he thinks one option surpasses the others on that dimension, he chooses it. If he still cannot discriminate among several options, he compares those on the second most important dimension, and so forth. An option's status on one dimension offers absolutely no compensation for less-than-par status on dimensions preceding it in the hierarchy. As formally developed the LEX model

pits option vs. option using a BEST rule at every stage. (The LEX model shouldn't be construed as merely a sequential processing model. For example, sequential processing is a perfectly legitimate assumption within the context of AVG models.) MINIMAX and MAXIMAX join LEX in this cell of the structure. A consumer applying MINIMAX compares the options on their worst attributes, rejecting one if another's "worst" attribute is less offensive or if another has fewer "worst" attributes which are equally as offensive. He minimizes maximum losses (or maximizes minimum gains if losses aren't possible). MAXIMAX implies a consumer compares options on their best attributes, choosing one over another if its "best" attribute is more desirable or if it possesses more "best" attributes of equal desirability.

Both the conjunctive (CONJ) and disjunctive (DISJ) models assume the individual sets up minimum cutoffs on each dimension. In CONJ, he reasons "if it has any below-cutoff features, reject it." DISJ is a mirror image to CONJ ..."if it has any above-cutoff features, it is acceptable." As formally developed neither CONJ nor DISJ necessarily leads to a unique choice; adding a FIRST rule handles this in a simple way. Russ [16] and Tversky [22] have independently described what is in essence a sequential conjunctive model. The consumer sets up cutoffs, then eliminates options not surpassing the cutoff on the most important dimension, the second most important, and so on. Russ labels this a "satislex" model and Tversky "elimination by aspects".[3] For clarity, we will call it simply a "sequential conjunctive" (CONJ-SEQ) model. In any case, the eventual choice from CONJ and CONJ-SEQ strategies is identical, assuming identical cutoffs.

The relative status of the strategies described as simplifying or as optimizing techniques is not immediately clear. An optimizing strategy must offer the consumer the chance to do justice to his own objective function. His final choice should emerge from a process which inputs in some way the status of the options on all subjectively nontrivial dimensions. Three strategies allow him to choose an option based on a positive differentiation on only one dimension: LEX, MAXIMAX, and DISJ. In contrast, all compensatory strategies and CONJ necessitate considering all dimensions of non-zero importance. These latter strategies might be viewed by consumers as having more optimizing potential than LEX, DISJ, or MAXIMAX.

Simplification potential is likewise not a simple problem. The consumer is essentially asking two questions: (1) how much cognitive exertion will it take to execute this strategy?; and (2) how likely is this strategy to actually discriminate a unique choice and end my conflict? He is concerned then with his maximum mental exertion during any stage in using the strategy, plus the total number of stages needed.

Several principles for simplifying can be proposed. In general differential weighting of the available information should tend to simplify the judgment task. Focusing on one dimension at a time is one dramatic form of differential weighting. (The effective weight of that one dimension becomes 1, and all others 0.) In the multidimensional case, a procedure (e.g., LEX) in which considering only one dimension could be determinant should offer more simplifying potential than one requiring

consideration of multiple dimensions (e.g., AVG). Using cutoffs is another dramatic form of differential weighting. For multi-dimensional options, procedures (e.g., CONJ or DISJ) where discovery of a single datum could be determinant should offer more simplifying potential than those necessitating consideration of every cue in every case (e.g., AVG, MINIMAX, or MAXIMAX). Where cutoffs are used, many options may qualify. If only k of the total set n of available options can be chosen, a FIRST rule eliminates the possibility of further processing effort.

THE CHOICE ENVIRONMENT

The basic choice environment facing a corsumer contains factors affecting his desire to find the optimal option (e.g., the magnitude of possible penalties for a mistake) and factors inducing him to try to simplify his information processing task. The latter are most relevant here. As a starting point, the concept of "information load" [17] offers a parsimonious and powerful model applicable to all choice environments. Information load is defined as the amount of information a person must handle per unit of time. Presumably, increasing information load will increase the relative urgency of simplifying needs. Information load is a function of at least four variables. An increase in load could result from decreasing the time available for processing or increasing the amount of information to be processed. Amount of information can be increased by increasing (a) the number of cues to be considered per option, (b) the number of options to be considered, or (c) the number of distracting cues (extraneous to the choice task) present.

The effect of these variables---number of options, number of cues per option, distraction, and time pressure---on decision processes has received surprisingly little attention [20].

Increasing the number of cues available per option has been shown to increase the decision-maker's confidence in the optimality of his choice although his actual accuracy doesn't increase and may degenerate [6, 8, 9, 14]. There is some evidence that the linear predictability of his judgments decreases as cues per option increase; however, Jacoby et al. [9, 10] reported the number of subjects whose choices were predictable by a subjectively weighted compensatory model increased as cues per option increased (as long as the number of options were relatively low). This may have been an artifact of not having equally relevant cues available in all conditions. Wright [26] found that the weighting of negative data tended to increase as time pressure and distraction increased. These results may indicate more frequent use of a CONJ strategy under difficult conditions.

Adaptations in choice strategies as the number of options to be considered increases haven't been examined although this factor may cause great difficulty for a consumer. Jacoby et al. [10] found that processing time increased substantially as options increased from four to sixteen, but rose only slightly as cues per option increased. One of the major questions examined in this study was how the number of options to be considered affected the difficulty of executing different choice strategies.

STUDY I: EXPECTATIONS ABOUT THE CHOICE STRATEGIES

Procedure and Subjects

Subjects were 300 men and women enrolled as undergraduate students in a large midwestern university. Each was given a concise written description of a strategy to use in choosing among sets of electronic resistors. It explained that the status of each resistor on four dimensions would be given and identified the nature of these dimensions. The procedure to be used in choosing among resistors was then spelled out clearly. Each subject was asked to read the rule description carefully and then to complete a questionnaire on his expectations of what the experience of trying to use that procedure would be like. Subjects in Study I did not actually try to apply the procedure. To promote understanding of the rule, subjects were encouraged to reread the rule description whenever they wanted while responding to the questionnaire.

The fifteen strategies developed in the introduction were used as stimuli. The compensatory rules entailed averaging across each of the four dimensions, treating "average" ratings as contributing zero and any rating above "average" as exactly balancing out any rating below "average". For AVG_e, all dimensions were to be given equal weighting. For AVG_d, ratings on one dimension were to contribute twice as much to the evaluation as ratings on the other dimensions. In two descriptions (AVG_e:BEST and AVG_d:BEST) subjects were told to choose the resistor in the set with the highest overall evaluation according to the averaging process. FIRST and ALL caveats were added to compensatory rules by setting up a "positive net evaluation" (greater than zero) as a threshold. For FIRST versions, the

subject was instructed to evaluate each resistor in the order he encountered it in the set and to choose the first he found with a positive net evaluation. ALL versions instructed subjects to choose every resistor in a set whose net evaluation was positive.

Three non-compensatory BEST rules were described: LEX, MAXIMAX, and MINIMAX. LEX established an ordering of the dimensions. If comparisons on the first dimension indicated a superior resistor, it was to be chosen. If not, the next dimension was to be consulted, comparisons remade, and so on. For MAXIMAX the resistor having the most "greatly above average" attributes was to be chosen. If several resistors were equivalent using this test, the one having the most "somewhat above average" attributes should be chosen, and so on. For the MINIMAX rule, the resistor having the fewest "greatly below average" attributes was to be chosen. If several resistors in a set had the same number of non-"greatly below average" attributes, the one with the fewest "somewhat below average" attributes was to be selected, and so on. CONJ, CONJ-SEQ, and DISJ rules were established by defining minimum cutoffs on each dimension: two cutoffs were set at "average" ratings and two at "somewhat above average" ratings. For DISJ the only necessary condition for a resistor to be chosen was possession of any attribute surpassing a cutoff. For CONJ, the requisite for choice was that all a resistor's attributes surpass the cutoffs. For the CONJ-SEQ models the same conditions held as for the CONJ models but the order in which the cutoff-tests were to be executed across dimensions was specified. FIRST rules again instructed the judge to evaluate resistors in order and choose the first meeting the criteria.

Analysis

To explore whether the COMB and RULE differences had general effects on subjects' simplifying expectations, their responses were analyzed in 2 x 3 ANOVAS. The fifteen separate rules were collapsed into six categories as shown in Figure 1. Table 1 summarizes the treatment means.

Subjects were asked how difficult they anticipated it would be to keep the rule described in mind while carrying out the choice process. (For all response scales in Table 1, lower scores indicate either "less difficult" or "more optimal".) The main RULE effect was significant ($F = 10.46$, $p < .001$). FIRST rules were seen as easiest to retain, followed by BEST and then ALL rules. This order held for both Compensatory and Non-Compensatory classes. COMB effect was not reliable ($F = 2.15$, $p < .15$), but the means were in the expected direction. Compensatory rules were seen as somewhat more difficult to retain than Non-Compensatory rules.

Anticipated confusion while using the rule was significantly affected by both COMB ($F = 3.99$, $p < .05$) and RULE ($F = 4.16$, $p < .02$). Subjects anticipated less frequent confusion for FIRST rules and for Non-Compensatory rules although this latter effect was confined to FIRST or BEST versions. This pattern of results held fairly closely for measures of the anticipated amount of concentration required (six or twelve options to choose from) and anticipated speed with which the decision could be made (six or twelve options to choose from). In each case, both the COMB and RULE effect were significant but not the interaction. The pattern of means was also similar; in each case, FIRST and

Non-Compensatory strategies were viewed as the simpler strategies with Non-Compensatory FIRST and BEST rules seen as causing the least cognitive strain.

When subjects were asked about the respective strategies as methods for making ideal choices and as methods which could be easily defended to others, only the main COMB effect was reliable. Compensatory strategies were seen as more efficient for making ideal choices ($F = 4.19$, $p < .05$) and more readily defensible ($F = 2.83$, $p < .10$). Although the data indicate that BEST strategies, particularly Compensatory-BEST, received somewhat better ratings on these measures than FIRST or ALL strategies, the difference wasn't reliable. This finding is somewhat unexpected. Finally, subjects' estimates of how often they used the procedure described in making everyday choices didn't differ significantly. Follow-up questioning revealed many subjects felt they couldn't give a meaningful response to this last question since "it depends on the situation." The notion of a general choice strategy apparently didn't match their own experiences.

The proposed classification of strategies apparently has some validity in differentiating them according to their relative simplifying and optimizing potential. There was of course variation in perceptions of the separate strategies and variation between strategies collapsed together by the proposed system. To gain insight into other systems, an exploratory factor analysis of the responses to the fifteen strategies was performed. The goal was simply to see how the strategies clustered together based on subjects' usage expectations. Ideally, we might find these groupings

bore some resemblance to those in the proposed system. This analysis was also important in choosing strategies to contrast for Study II.

To accomplish the analysis, mean scores on each of the ten dimensions were computed for each rule separately. Correlations between the means were then used in a principle-components factor analysis and the simple factor structure rotated to yield orthogonal factors. Using the means for each rule as input was necessary since each subject responded to only one rule; in using this approach it is assumed the means give a reliable estimate of general perceptions of each rule. The factors are described in Table 2. Examining the means for those rules loading highly on each factor helps in interpreting the groupings of rules.

The strategies loading on factor I were uniformly expected to be more difficult to keep in mind, to require more concentration, to require more time in making the choice, and to produce greater confusion. A judicious lable for factor I might be "tedious to execute". AVG_d strategies and ALL versions dominated this grouping. Strategies loading on Factor II were uniformly expected to be very simple to keep in mind, to quickly enable a final choice, and to cause little confusion in use. Subjects were quite confident they could use these strategies without error. It is tempting to label this the "quick and dirty" class---"easy to execute" is probably a less biased description. This group consisted entirely of Non-Compensatory strategies with FIRST versions dominating. Only two strategies comprised the third factor: AVG_e: FIRST and AVG_e: BEST. Subjects thought they would be simple to keep in mind and readily

defensible to others, and were quite confident they could use them without error. Additionally, both strategies received ratings better than the overall mean on efficiency for making the most ideal choice from a group of products. A possible label would be "(fairly) simple and sound" although this may not do justice to the underlying similarities. Both the fourth and fifth factors accounted for only about 7% variance and were MAXIMAX and MINIMAX respectively. Interestingly, MAXIMAX was expected to be very easy to use, comparing favorably with Group II strategies in that area, but was viewed as much more readily defended and more likely to lead to ideal choices than Group II strategies. MINIMAX, in contrast, was uniformly expected to be very difficult to execute and unlikely to yield ideal choices.

Study I was undertaken primarily to sort out the numerous models for further examination. The data on subjective expectations are suggestive but their value is limited since the subjects were responding only to descriptions. They had no necessary experience actually applying the procedures described. Study II was designed to compare the actual usage experiences to individuals applying the respective strategies.

STUDY II: USAGE EXPERIENCE WITH VARYING NUMBERS OF OPTIONS

Procedure and Subjects

Subjects were drawn from the same population as those in Study I, although none were repeaters. Each had volunteered and was compensated. Each was told his task was to apply the procedure described as accurately as possible in choosing among the sets of electronic

resistors to be described. He was told to read the description carefully until he was satisfied he clearly understood it, since he wouldn't be allowed to refer back to it once he began the choice task.

After the introduction, each subject was randomly assigned to one cell of the 3 x 4 design (three "number of options" conditions; four "strategy" conditions). Final cell size was fifteen. When the subject was through with the description, he was given a booklet containing descriptions of the different resistors. Each resistor was identified by a letter. He was also given a response sheet which identified (by letter) the resistors comprising each "choice set". He was given two possible responses for each set: indicate by letter the resistor(s) he chose or indicate that he could not make a choice. Subjects proceeded through the choice task at their own pace. After the task was completed, a questionnaire asking about their experience with the decision-making task was presented.

The four strategies comprising the treatments in Study II were AVG_e:BEST; AVG_w:BEST; CONJ:ALL, and LEX. Each has substantial a priori plausibility as a model of consumer choice processes, as evidenced by the frequency with which it reappears in the decision-making literature. Two are Compensatory and two Non-Compensatory. Between them, they represent quite different assumptions. The other consideration in selecting these was their ability to represent the clusters discovered in Study I. AVG_w:BEST and CONJ:ALL are, respectively, a Compensatory and Non-Compensatory model loading on Factor I. LEX loaded highly on Factor II and AVG_e:BEST on Factor III.

The descriptions used were identical to those used in Study I. The descriptions themselves were equated for clarity. At least 95% of the Study I subjects exposed to each of these descriptions had been able to replay it perfectly several minutes after reading the description.

Fourteen choice sets were defined for each subject, consisting of either two, six, or ten resistors per set. Two options are the minimum necessary for a choice conflict to exist. Evidence suggests an upper limit for comfortably handling information at around six pieces [12]. Since three of these strategies required comparing option vs. option, six options was expected to represent maximum comfortable load. Ten options would then represent definite "overload" and completed the sequence. Consumers may often find up to ten options available. The three conditions attempted to create minimal load, maximum "comfortable" load, and overload.

Each resistor was described on four scales: load life stability, flexibility of specifications, flammability, and delivery lead times. Each scale was composed of five levels and each level was labeled: greatly below average, somewhat below average, average, somewhat above average, and greatly above average. The descriptions were constructed so each rating occured about an equal number of times and so choice problems were actually set up (i.e., so there were few sets where a rule led to a "can't choose" response).

Analysis

For each subject, the percentages of choice sets where correct choices were made was computed. Mean accuracy percentages are shown in Table 3. Table 3 also presents the means for each of the post-task

questions subjects answered. Each of these measures was analyzed via a 3 x 4 factorial ANOVA.

As the number of options to be considered increased, the accuracy with which decisions were made decreased ($F = 45.07$, $p < .001$). Performance levels were fairly high with only two options but deteriorated considerably for six or ten options. The main effect for strategy was also significant ($F = 5.60$, $p < .001$) and is due to the generally better execution shown by subjects using LEX compared to other subjects. Most interesting, the interaction effect was also significant ($F = 5.55$, $p < .001$). This interaction is shown in Figure 2. Both AVG_e and LEX were executed almost perfectly for only two options, while even in this simplest condition subjects using AVG_d or CONJ made mistakes about a quarter of the time. As the number of options increased to six, success in applying AVG_e and AVG_d dropped substantially (to around 50%). Success with CONJ remained stable and success with LEX declined but was still fairly high. When the subjects had ten options to consider in each choice set, they were accurate only about half the time regardless of which strategy they attempted to use.

In Table 1 the lower the score, the "simpler" the rating. The generally low scores indicate subjects didn't feel applying the respective choice procedures was a very exerting experience. In one sense, these optimistic beliefs aren't surprising; the strategies assigned were basic and straightforward. On the other hand, the task structure did vary from fairly simple to fairly taxing. The previous analysis clearly demonstrated that subjects

often had considerable difficulty with their cognitive comparisons, yet they were apparently not sensitive to their inefficiency.

The ANOVA for responses to the question about usage difficulty yielded significant main effects due to Options ($F = 25.78$, $p < .001$) and to Strategy ($F = 3.51$, $p < .02$). Again the interaction effect was significant ($F = 2.44$, $p < .03$). Figure 3 shows the interaction. Subjects perceived clear differences in difficulty as the number of options increased. AVG_e and LEX were accurately perceived as simple to use for two options with AVG_d and CONJ causing more trouble. The pattern of perceived difficulty for LEX matched the objective accuracy data fairly closely as the number of options increased. Perceived difficulty increased with increasing options for both AVG_e and AVG_d but not as fast as was warranted by actual deterioration in accuracy. For six options, subjects using CONJ felt more difficulty than their counterparts using the AVG rules despite relatively more accurate performances with CONJ.

Analysis of responses to questions on frequency of confusion and difficulty in keeping the rule in mind during the choice task yielded fairly comparable results. For the confusion question, the Strategy main effect was significant ($F = 5.32$, $p < .002$) as was the Options effect ($F = 6.38$, $p < .003$). For the ease of retention question, the Strategy effect ($F = 21.11$, $p < .001$) and the Options effects ($F = 13.27$, $p < .001$) were likewise significant. Neither interaction proved reliable. Perceived frequency of confusion and difficulty in retention increased markedly only where

ten options were being considered. Subjects reported more difficulty executing CONJ on these measures, which was unexpected. Interestingly, AVG_d was reported as significantly less difficult to keep in mind than AVG_e ($t = 3.37$, $p < .001$). This may have been because AVG_d provided a natural starting point (the more important dimension) on which to anchor while AVG_e didn't.

Confidence in having made the correct choices decreased as the number of options increased ($F = 12.11$, $p < .001$). Handling six options led to relatively lower confidence than two options ($t = 2.99$, $p < .05$) and ten options created less confidence than six ($t = 4.88$, $p < .01$). The Strategy effect was not significant. (To reemphasize, even though feelings of confidence differed across conditions, confidence remained fairly high in general.) Correlations between reported confidence and accuracy ratios were computed separately for subjects in each Options condition. In each case, the adjusted correlation was positive and significant (two options: $r = .43$; six options: $r = .44$; ten options: $r = .32$). The strength of relationship was modest however, indicating that in the absence of feedback about accuracy, confidence doesn't necessarily reflect performance.

Simplifying and optimizing may often be antagonistic goals. Subjects were asked whether they felt the type of procedure they had tried to apply is, in general, efficient as a way to make the ideal choice from a group of options. A significant Strategy effect was found ($F = 4.32$, $p < .01$) with CONJ users more appreciative of its optimizing potential than users of other strategies. Interpretations of CONJ as a non-maximizing strategy may be worth reexamining.

Finally, subjects were asked how often they seemed to use that same type of strategy in making everyday choices in comparable situations. Neither main effect was significant but the interaction was ($F = 2.68$, $p < .02$)(see Figure 4). Where only two options were being considered, subjects using AVG_e reported most frequent usage. For six options, AVG_d was reported as most frequently used. For ten option situations, reported usage rates split apart more clearly. CONJ was reported as most frequently used and LEX as least frequently used.

DISCUSSION

The perspective guiding this research was that consumers consider both the ultimate goal of consumption satisfaction and immediate subgoals related to information handling difficulties when entering a choice task. In certain situations the former may dominate the latter and vice-versa. The choice strategy adopted can thus be modeled in basic expectancy theory terms, i.e., in terms of subjective expectations about the outcomes of applying a strategy and subjective valuations of those outcomes. As a prelude to general hypotheses about the conditions in which consumers tend to use one or another choice strategy, subjective expectations about the use of the strategies from a simplifying view and an optimizing view were examined.

These subjects were apparently not very sensitive to their frailties as information processors. A consumer may not feel strained applying a strategy even though he is applying it inaccurately. Based on his inaccuracy, we might be tempted to label the strategy

difficult to use and infer that he is unlikely to try it under difficult conditions. But objective difficulty is not the relevant criteria; subjectively experienced strain is. In the absence of feedback a consumer is unlikely to learn of his inadequacy in executing the strategy. If he didn't feel strained, he would regard that strategy as a likely candidate where simplifying is important to him. Reliable feedback is unlikely in most decision making settings in which consumers operate. Further, the only feedback is whether the product chosen actually led to desired outcomes. If a consumer decides he made a poor choice, he cannot easily sort out the locus of his problem. Was his original subjective evaluation policy wrong? Or was his policy fine but poorly executed?

Executing a compensatory strategy under moderate information load intuitively seems fairly exerting. This data indicate accurate execution is unlikely except under light loads. Nevertheless, these subjects didn't feel overly strained by compensatory strategies. This argues that consumers may not avoid such strategies when simplifying is necessary. Of course, an alternate explanation of these results is that the subjects did in fact avoid the compensatory strategy they were assigned by mentally doing something else when taxed. Hence, their poor accuracy. Testing that explanation via more direct questionnings than were used here seems desirable.

Results for the CONJ strategy were somewhat unexpected. Applying the CONJ strategy was not expected to be a demanding task; indeed, Einhorn [6] has characterized it as relatively simple and his logic is intuitively appealing. Perceptions of naive subjects

in Study I suggested that whether or not CONJ is difficult to execute might depend on whether or not it is coupled with a "choose the first" rule. In Study II, a CONJ:ALL strategy was used by the subjects. Subjects were surprisingly inaccurate in using CONJ:ALL for two-option choices but relatively more accurate for six-option choices. However, subjective user's reports indicated CONJ:ALL caused relatively more confusion and retention problems. Thus, naive subjects and experienced users tended to feel CONJ:ALL was not necessarily as simple a strategy as was predicted.

What would make CONJ seem cognitively difficult to use? The user must keep in mind something special about each dimension---the exact cutoff point. The only other strategy forcing him to keep salient some special aspect of the dimensions was the AVG_d strategy. Retaining the four cutoffs apparently required more concentration than retaining only one differential weight, (AVG_d) or no special features (AVG_e and LEX). When might a CONJ strategy be simpler to apply? In this study, the cutoffs imposed were set at different levels along the dimensions (two at "average, two at "somewhat above average"). Perhaps CONJ is easier to use where all cutoffs occur at the same point (e.g., "average"). CONJ may also be easier for "either-or" or "possession" type dimensions ("blue vs. not blue", "size 12 vs. not size 12", "has power steering vs. doesn't").

CONJ's relatively high potential for optimizing in the eyes of its users was also somewhat unexpected. CONJ is the only one of the four strategies in Study II that didn't entail direct product vs. product comparisons. Choosing an ideal option does of course imply conceiving the necessary features of such an option, then

demanding those. Some prior discussions of "minimal criteria" strategies have characterized these as non-optimizing [e.g., 7, 19]. However, such procedures have proven popular in research on problem solving processes [13]. Kanouse and Hanson [11] drew on prior work about the distribution of outcomes people expect in their life to argue "it may be easier to obtain happiness by maximizing the proportion of nonnegative outcomes than by maximizing the positivity of individual outcomes [11, p. 58]." The notion is that tradeoff strategies don't maximize satisfaction for a consumer who can choose just one option but seeks multiple satisfactory outcomes. How high the criteria are set in CONJ models makes a difference in whether they connote a "minimum qualifier" or "ideal-point matching" strategy. Contrast "he'll date anyone who has X and Y and Z" with "he won't date anyone unless she has X and Y and Z".

Executing a CONJ strategy entails counting the number of satisfactory attributes. MAXIMAX pictures an analogous counting process for multidimensional products. Subjects in Study I thought MAXIMAX would be a very efficient way to make ideal choices. The results for CONJ and MAXIMAX suggest that consumers may see counting, with cutoffs, as a viable optimizing method.

Subjects did not apparently find any of these choice strategies very strainful or confusing. We may wonder whether differences of the magnitude found will actually be a factor when consumers adopt a choice strategy. But only one ingredient of information load was varied in this study: number of options. Time pressure and distractions were both minimal, and the number of cues which could possibly

be considered per option was limited. In many decision environments, combinations of these factors contribute in making the information processing task much more tedious. The information available here was expressed in common scale units which should itself simplify processing tasks, especially where averaging is used. Mixtures of qualitative and quantitative data will often confront the consumer. Viewed from this perspective, finding the perceived difficulty of using various strategies changed as options increased suggests strongly that even greater variations should be expected under even more realistically difficult conditions.

Other methods individuals may use to simplify choice tasks have been suggested. For example, where prior information about the products has been encountered piece by piece, the person will have created and stored a global affect impression for each option. When pressed, the most accessible piece of data to consult will often be this single affect index. (Unidimensional affect is of course the core notion in original "attitude" concepts; global affective impressions are created in the first place to be used by the individual when more rigorous processing isn't feasible.) In employing "affect-referral" [24] as a choice strategy, no integration or reintegration of attribute specific data occurs. The consumer merely consults his already formed global affect ratings for directionality or compares them to see which is best. This is probably a popular tactic for consumers under time pressure, although subjects in this study couldn't have used it. As another example, Slovic and Lichtenstein [19; see also 22], have described a "starting point and adjustment" strategy. The judge focuses initially on an option's

status on a single salient dimension, then adjusts the starting judgment in a general, imprecise way to take into account the other data. An interesting hypothesis is that people setting out to apply a compensatory strategy really wind up merely using a starting point and adjustment procedure.

A viable technique for influencing someone's final choice is to convince him to apply a particular choice procedure, presumably one which favors the product you advocate. In promoting a particular strategy, its benefits vis-a-vis simplifying, defensibility, etc. might be stressed. But two sources of breakdown can occur in such a persuasion attempt. He may remain unconvinced to apply the recommended procedure. Or, even if completely convinced and trying, he may "blow" the execution and still make some choice other than the intended one. Study II in effect set up the latter situation. Apparently, poor execution of even basic choice procedures should be anticipated unless the choice environment is structured into a very simple task [see 28]. A two-stage communication campaign is thus necessary if the final choice is to be systematically influenced: (1) the campaign should assist the consumer in structuring his multialternative, multidimensional dilemma into a very simple problem, then (2) the ultimate choice strategy can be recommended. Without step one, chances are high that the consumer will not execute the final choice policy he himself wishes to with very high accuracy. The outcome will not be the one sought by either party, the consumer or the marketer. Taking a larger perspective, it is unlikely that any marketing program can be efficient unless intended consumers can successfully execute their intended evaluation procedures. Only products for which no true subjective demand exists benefit from errors in choice processes, and hence, from overwhelmed consumers.

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FOOTNOTES

[1]To avoid semantic problems, the following definitions are used in the text. A dimension is a continuum of characteristics, traits, attributes, outcomes, or values. Points or levels along a dimension are characteristics. Thus, "flammability" is a dimension composed of multiple levels. Any one of those levels, such as "greatly above average flammability", is a characteristic. A piece of data describing a characteristic of a product is a cue. Cues then correspond to specific characteristics, not dimensions.

[2]To be perfectly clear, with a compensatory model cues necessarily have a compensating influence on each other. In a noncompensatory model, compensation may take place in limited cases and in a limited sense.

[3]Tversky proposes that the ordering of the sequence is probabilistic, whereas more traditional LEX models assume a stable a priori ordering of the dimensions by the individual.

Table 1

MEAN RESPONSES TO STRATEGY DESCRIPTIONS

CHOICE STRATEGIES	MEASURES[a]							
	Storage Difficulty[b]	Confusion[c]	Concentration[d]	Speed[e]	Confidence[f]	Ideal Efficiency[g]	Defensible[h]	Usage Frequency[i]
A. Compensatory	3.41	3.69	4.41	3.98	2.95	3.73	3.37	4.50
1. Best	3.38	3.80	4.48	4.23	2.64	3.32	3.00	4.41
2. First	2.84	3.50	4.19	3.38	2.88	3.88	3.61	4.50
3. All	4.00	3.75	4.56	3.30	3.30	4.00	3.51	4.58
B. Non-Compensatory	3.08	3.26	3.65	3.51	3.30	4.18	3.73	4.55
1. Best	3.01	3.16	3.56	3.58	3.35	4.07	3.77	4.66
2. First	2.45	2.70	3.00	2.88	2.95	4.30	3.70	4.03
3. All	3.78	3.93	4.40	4.08	3.57	4.16	3.72	4.96
1. Best	3.20	3.48	4.45	3.90	3.00	3.70	3.38	4.54
2. First	2.64	3.10	4.04	3.13	2.91	4.08	3.66	4.26
3. All	3.90	3.84	4.82	4.21	3.44	4.08	3.61	4.77

[a]All seven point scales; [b]endpoints "very simple"-"very difficult"; [c]endpoints "rarely confused"-"frequently confused"; [d]endpoints "very little concentration"-"very much concentration"; [e]endpoints "very quickly"-"very slowly"; [f]endpoints "highly confident"-"extremely confident"-"extremely unconficent"; [g]endpoints "extremely efficient"-"extremely inefficient"; [h]endpoints "very easy to defend"-"very difficult to defend"; [i]endpoints "use very often"-"use very rarely".

Table 2

FACTOR LOADINGS FOR FIFTEEN CHOICE STRATEGIES

FACTOR	STRATEGY	LOADING	CHARACTERIZATION
I (34.1%)	AVG_d: all	.89	*more difficult to keep in mind
	AVG_d: best	.87	*more concentration to execute
	CONJ: all	.86	*requires more time to finish the choice task
	CONJ-SEQ: all	.82	*more frequent confusion
	AVG_e: all	.79	
II (32%)	LEX	.98	*very simple to keep in mind
	DISJ: first	.94	*require little time to finish the choice task
	CONJ: first	.87	*rarely confusing
	CONJ-SEQ: first	.78	*high confidence that execution would be error-free
III (18%)	AVG_e: first	.83	*fairly simple to keep in mind
	AVG_e: best	.74	*readily defensible to others *high confidence that execution would be error-free
IV (7%)	MAXIMAX	.74	*fairly efficient in leading to ideal choice
V (7%)	MINIMAX	.64	

Table 3

TREATMENT MEANS FOR STUDY II

Treatments: Decision Strategy	Options	% Correct[a]	Ease of Use[b]	Confusion[c]	Storage Difficulty[c]	Confidence[c]	Ideal Efficiency[c]	Usage Frequency[c]
AVG_e		.64	2.4	2.6	2.6	2.3	3.9	3.9
	Two	.92	1.2	1.8	1.8	1.6	4.2	3.5
	Six	.49	2.5	3.1	2.5	2.5	3.5	4.3
	Ten	.49	3.5	3.0	3.5	2.6	3.9	3.7
AVG_d		.63	2.5	2.4	1.6	2.9	4.0	4.3
	Two	.77	2.4	2.5	1.4	2.1	3.7	4.6
	Six	.54	2.3	1.6	1.4	3.3	4.0	3.7
	Ten	.56	2.8	2.9	2.1	3.4	4.4	4.6
CONJ		.66	3.0	3.3	3.6	2.8	3.1	3.9
	Two	.73	2.3	3.0	3.3	2.5	3.4	4.5
	Six	.68	3.1	3.1	3.6	2.3	3.3	4.3
	Ten	.57	3.7	3.8	3.9	3.5	2.7	3.0
LEX		.77	2.3	2.2	2.0	2.2	4.1	4.6
	Two	.98	1.4	1.9	1.5	1.7	4.1	4.5
	Six	.83	1.8	2.0	1.4	1.9	4.4	4.3
	Ten	.49	3.6	2.9	3.1	2.9	3.9	5.0
	Two	.85	1.8	2.3	2.0	2.0	3.9	4.3
	Six	.63	2.4	2.5	2.2	2.5	3.8	4.2
	Ten	.53	3.4	3.1	3.2	3.2	3.7	4.1

[a]Number of sets where correct choice(s) was made/total sets (14)
[b]7-point scale; endpoints "very easy to use"-"very difficult to use"
[c]7-point scales; same endpoints as in Table 1.

Figure 1

A TAXONOMY OF CHOICE STRATEGIES

CHOICE RULE	CUE COMBINATION PROCESS	
	COMPENSATORY	NON-COMPENSATORY
BEST	AVG_e	LEX
		MAXIMAX
	AVG_d	MINIMAX
FIRST	AVG_e	DISJ
		CONJ
	AVG_d	CONJ-SEQ
ALL	AVG_e	DISJ
		CONJ
	AVG_d	CONJ-SEQ

FIGURE 2

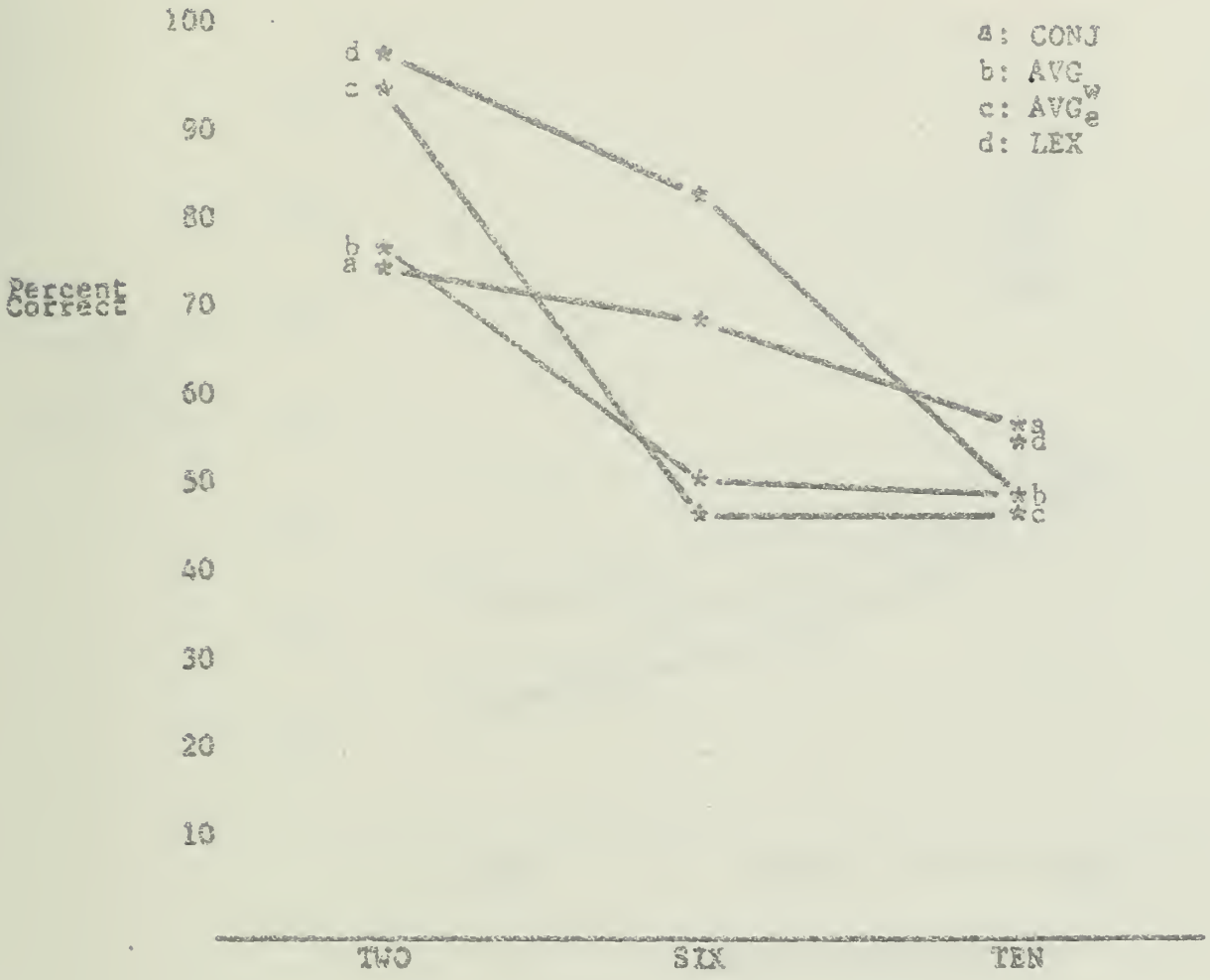

100
90
80
70
60
50
40
30
20
10
Percent Correct
a: CONJ
b: AVG_w
c: AVG_e
d: LEX
TWO
SIX
TEN
Number of Options

FIGURE 3

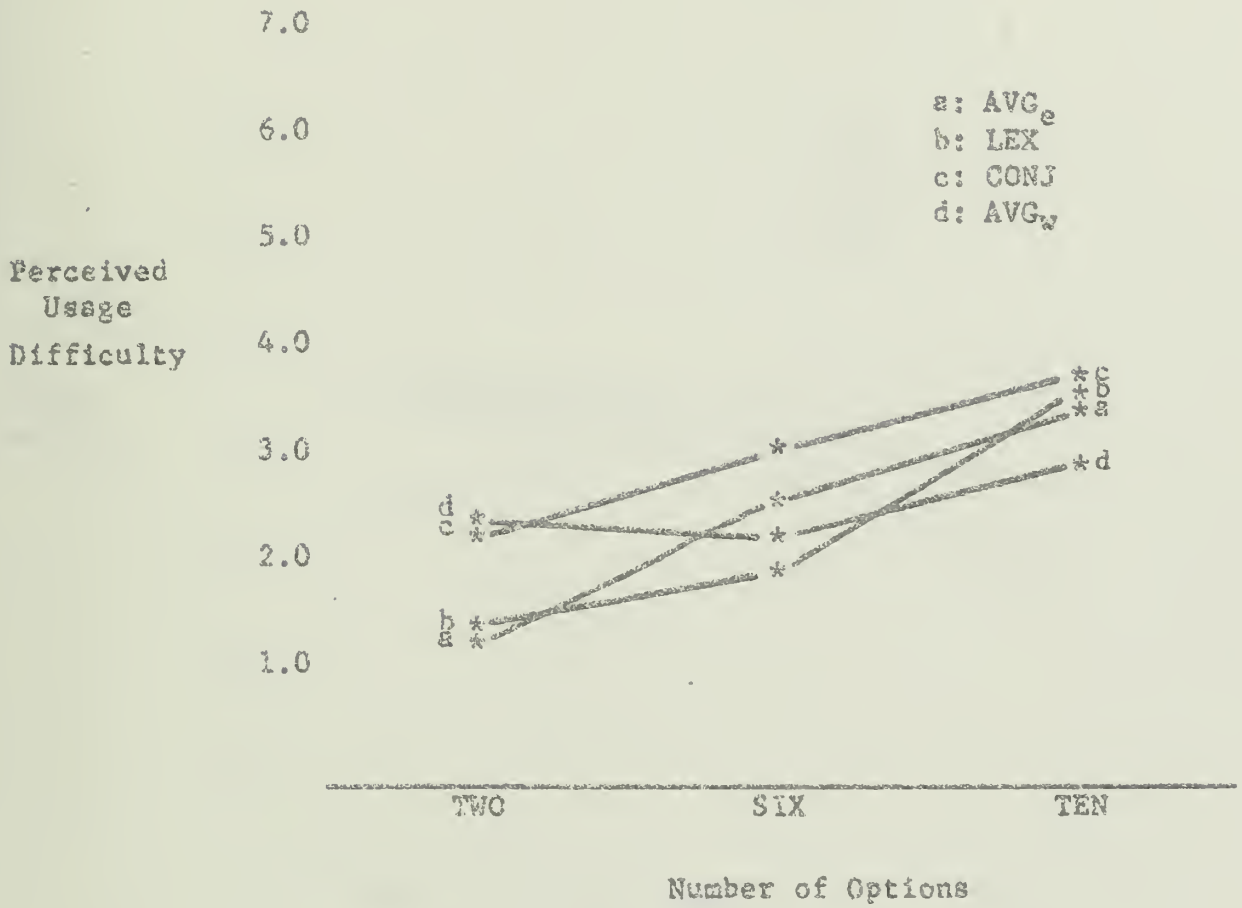
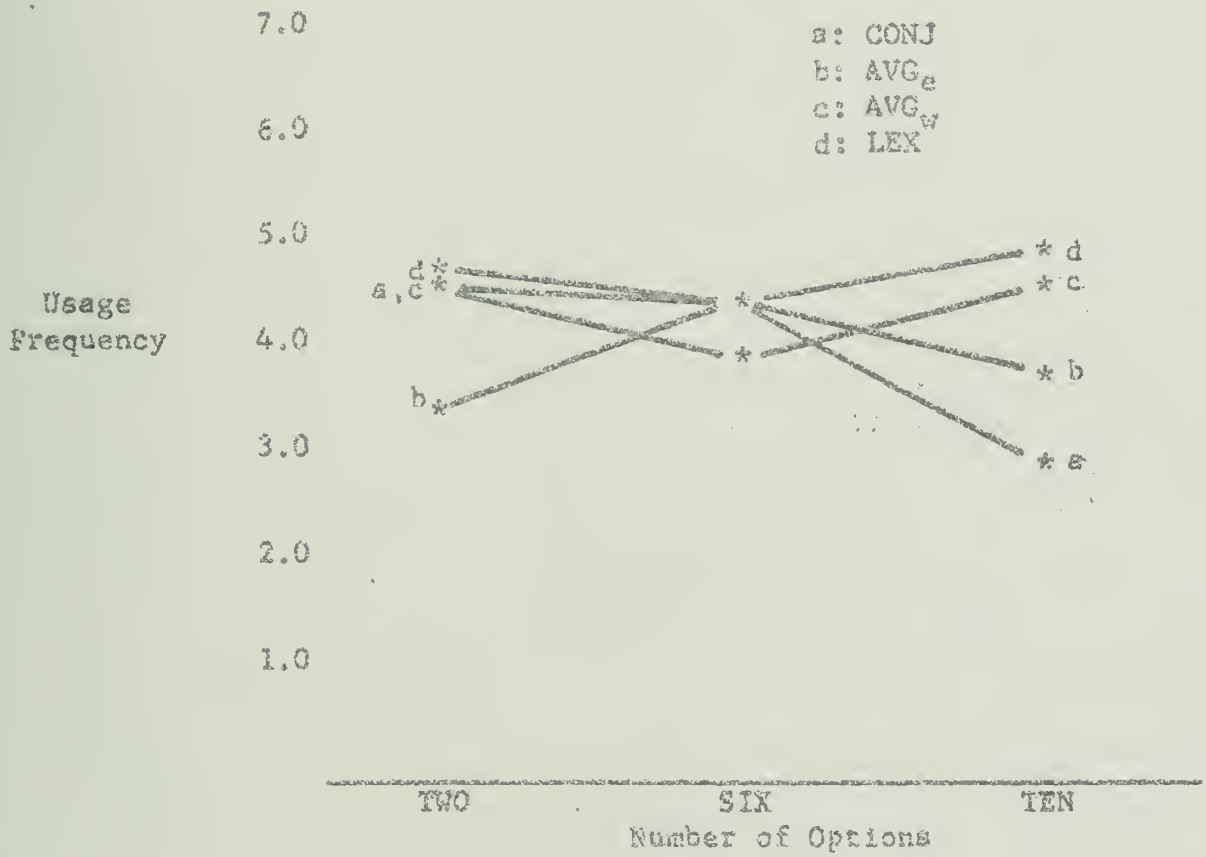

7.0
6.0
5.0
4.0
3.0
2.0
1.0
a: AVG$_e$
b: LEX
c: CONJ
d: AVG$_w$
Perceived Usage Difficulty
TWO
SIX
TEN
Number of Options

FIGURE 4


7.0
6.0
5.0
4.0
3.0
2.0
1.0
Usage Frequency
a: CONJ
b: AVG$_e$
c: AVG$_w$
d: LEX
a, c
d
b
d
c
b
e
TWO
SIX
TEN
Number of Options

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